What is claimed is:

1. A process for producing an ammonium polythiomolybdate of the formula $(NH_4)_2Mo_3S_{13} \cdot n\,H_2O$ where n is 0, 1 or 2 comprising:

(a) reacting an aqueous ammoniacal molybdate solution with hydrogen sulfide gas at superatmospheric pressure until the H_2S is no longer absorbed by the solution, said solution and said gas being in a closed system and the flow of said gas being regulated at an elevated pressure to form a slurry consisting essentially of a solid essentially all of which is ammonium tetrathiomolybdate containing a portion of the starting molybdenum and a mother liquor containing the balance of the molybdenum;

(b) heat soaking the reaction product of step (a) at elevated temperatures up to about 200°C in a closed reactor in the presence of elemental sulfur at a pressure of 600-1000 psig whereby the ammonium tetrathiomolybdate is converted to $(NH_4)_2Mo_3S_{13} \cdot n\,H_2O$;

(c) cooling said slurry to ambient temperature;

(d) separating said solid from the major portion of said mother liquor;

(e) washing said solid with water followed by removing the resulting water washes to remove the remaining portion of said mother liquor and soluble impurities from said solid; and

(f) drying the resulting washed solid at ambient temperature to form the $(NH_4)_2Mo_3S_{13} \cdot n\,H_2O$.

2. The process of claim 1 wherein the ammonium polythiomolybdate is $(NH_4)_2Mo_3S_{13}$.

3. The process of claim 1 wherein the ammoniacal solution comprises MoO_3, $(NH_4)_2S$ and elemental sulfur.

4. The process of claim 1 wherein the pressure in step (a) is 5-50 psig.

5. The process of claim 1 wherein the temperature in step (b) is 175-200°C.

6. The product prepared by the process of claim 1.